

REMARKS

The Pending Claims

Claims 1-3, 5, 7, 29, 30, 33, 44-48, and 58-67 currently are pending. The pending claims are directed to an ink-jet recording medium comprising a substrate having a glossy coating thereon, the glossy coating comprising fumed alumina particles and a binder.

Discussion of the Amendments to the Specification

The paragraphs beginning at page 10, line 3, and page 10, line 24, of the specification have been amended to correct typographical errors contained therein. No new matter has been added by way of these amendments.

Discussion of the Claim Amendments

Claims 27, 28, and 49-57 have been canceled without prejudice or disclaimer of the subject matter recited therein. Claims 5, 29, and 30 have been amended to provide that the fumed alumina particles comprise aggregates of primary particles, and the aggregates have the recited mean diameter values. These amendments are supported by the specification, for example, at page 6, lines 22-26, page 7, lines 8-15, and page 7, line 32 – page 8, line 7 (as amended in Applicants’ “Response to Office Action” dated August 9, 2002). New claims 58 and 59 have been added to recite the particle size distribution of the aggregates. These amendments are supported by the specification, for example, at page 7, lines 16-31. New claims 60-67 have been added to recite that the fumed alumina particles comprise aggregates of primary particles and the mean diameter of those primary particles. These amendments are supported by the specification, for example, at page 8, line 28 – page 9, line 21. No new matter has been added by way of these amendments.

Summary of the Office Action

The Office Action rejects claims 1-3, 5, 7, 27, 33, 44-49, 52, 53, and 55-57 under 35 U.S.C. § 102(b) as allegedly anticipated by U.S. Patent No. 5,171,626 (Nagamine et al.) (hereinafter “the Nagamine ‘626 patent”). The Office Action rejects claim 28 under 35 U.S.C. § 103(a) as allegedly unpatentable over the Nagamine ‘626 patent in view of U.S. Patent No. 6,468,395 (Chao et al.) (hereinafter “the Chao ‘395 patent”). The Office Action also rejects claims 29, 30, 49, and 50 as allegedly unpatentable over the Nagamine ‘626 patent in view of U.S. Patent No. 5,198,306 (Kruse) (hereinafter “the Kruse ‘306 patent”). The Office Action further rejects claims 1-3, 5, 7, 27-30, 33, 44-53, and 55-57 as allegedly

unpatentable over U.S. Patent No. 5,561,454 (Kurabayashi et al.) (hereinafter “the Kurabayashi ‘454 patent”) in view of the combination of U.S. Patent No. 5,910,359 (Kobayashi et al.) (hereinafter “the Kobayashi ‘359 patent”), U.S. Patent No. 5,856,001 (Okumura et al.) (hereinafter “the Okumura ‘001 patent”), and one or more of: the Kruse ‘306 patent, U.S. Patent No. 5,911,855 (Dransmann et al.) (hereinafter “the Dransmann ‘855 patent”), U.S. Patent No. 6,238,784 (Mochizuki et al.) (hereinafter “the Mochizuki ‘784 patent”), and the *Handbook of Fillers*, page 131 (2nd Ed.). Lastly, the Office Action requires correctional of a typographical error appearing on page 10 of the specification and rejects claim 54 under 35 U.S.C. 112, second paragraph, as allegedly indefinite.

Discussion of the Section 112, Second Paragraph, Rejection

The Office Action rejects claim 54 as allegedly indefinite for failing to particularly point out and distinctly claim the subject matter that applicants regard as the invention. In particular, the Office Action notes that claim 54 lacks sufficient antecedent basis insofar as it depends from a canceled base claim. As noted above, claim 54 has been canceled. Accordingly, the Section 112, second paragraph, rejection has been rendered moot and should be withdrawn.

Discussion of the Section 102 and 103 Rejections over the Nagamine ‘626 Patent

The Office Action rejects claims 1-3, 5, 7, 27, 33, 44-49, 52, 53, and 55-57 as allegedly anticipated by the Nagamine ‘626 patent. The Office Action further rejects claims 28-30, 49, and 50 as allegedly unpatentable over the Nagamine ‘626 patent in view of the Chao ‘395 patent or the Kruse ‘306 patent. In particular, the Office Action asserts that the Nagamine ‘626 patent discloses an ink-jet recording medium comprising a substrate having a glossy coating thereon. The Office Action further asserts that the Nagamine ‘626 patent provides that the glossy coating comprises a binder and fumed alumina particles having a surface area of about 30-80 m²/g. The Office Action also asserts that, in view of the similarities between the ink-jet recording medium recited in the pending claims and the ink-jet recording medium disclosed in the Nagamine ‘626 patent, the ink-jet recording medium disclosed in the Nagamine ‘626 patent would inherently exhibit a 75° specular gloss of about 15% or more, as recited in the pending claims. Applicants traverse these rejections.

The Nagamine ‘626 patent discloses an ink-jet recording medium comprising a substrate and a pigment layer provided on the substrate. The pigment layer comprises (i) an upper layer containing an aluminum oxide and (ii) a lower layer containing an aluminum oxide having a smaller surface area than the aluminum oxide in the upper layer (see, e.g., the

Nagamine '626 patent at col. 2, lines 41-48). The Nagamine '626 patent further provides that the aluminum oxide contained within the lower layer should have a specific surface area of 10-90 m²/g, and the aluminum oxide contained within the upper layer should have a specific surface area of 90-170 m²/g (see, e.g., the Nagamine '626 patent at col. 4, lines 1-8 and 45-53). Thus, the Nagamine '626 patent discloses an ink-jet recording medium in which aluminum oxide particles having a surface area of about 10-90 m²/g are contained within an intermediate pigment layer, which layer is disposed between the substrate and an upper pigment layer.

While the ink-jet recording medium defined by the pending claims can comprise more than one coating layer, the glossy coating recited in the pending claims must be the uppermost layer of the recording medium. Indeed, this arrangement is implicit from the recitation of a specular gloss measurement of the glossy coating insofar as the specular gloss of the glossy coating cannot be measured if the glossy coating is covered by one or more additional coatings. Thus, the uppermost layer of the ink-jet recording medium defined by the pending claims must comprise a binder and fumed alumina particles having a surface area of about 30-80 m²/g. However, as noted above, the Nagamine '626 patent specifically provides that the uppermost layer of the ink-jet recording medium disclosed therein must comprise aluminum oxide particles having a surface area of 90-170 m²/g. Indeed, the Nagamine '626 patent explicitly teaches that the surface area of the aluminum oxide contained within the uppermost layer should not be less than 90 m²/g.

The Office Action is correct in noting that Example 3 of the Nagamine '626 patent discloses an ink-jet recording medium in which the uppermost layer comprises a binder and alumina particles having a surface area of about 60 m²/g. However, the alumina particles used in the recording medium set forth in Example 3 are *not fumed* alumina particles. The Nagamine '626 patent provides that the alumina particles used in the uppermost layer of the recording medium of Example 3 are γ -alumina particles (i.e., particles of alumina in the gamma crystalline phase). While *fumed* alumina particles exist in a variety of crystalline phases, the predominant crystalline phase of fumed alumina particles is θ -alumina (see, for example, *Overview: Fumed Metal Oxides*, <http://w1.cabot-corp.com/controller.jsp?N=23+4294967082+1001&entry=product> (printout attached)). Therefore, the γ -alumina particles used in Example 3 of the Nagamine '626 patent cannot be *fumed* alumina particles. Accordingly, the Nagamine '626 patent fails to teach or suggest a recording medium in which the glossy coating (i.e., uppermost layer) comprises a binder and fumed alumina particles having a surface area of about 30-80 m²/g, as recited in the pending claims.

Moreover, it would not have been obvious for one of ordinary skill in the art to substitute fumed alumina particles having a surface area of about 30-80 m²/g for the γ -alumina particles used in Example 3. As noted above, the Nagamine '626 patent specifically provides that the surface area of the aluminum oxide particles in the upper layer should not be less than 90 m²/g (see, e.g., the Nagamine '626 patent at col. 4, lines 6-8). Indeed, when fumed alumina particles are used in the uppermost layer of the recording media disclosed in Nagamine '626 patent, those fumed alumina particles have a surface area of 100 m²/g (see, e.g., the Nagamine '626 patent at col. 9, Example 4). Thus, to the extent that the Nagamine '626 patent discloses or suggests a recording medium in which the uppermost layer comprises *fumed* alumina particles, the alumina particles have a surface area well in excess of the surface area recited in the pending claims.

Lastly, contrary to the Office Action's assertions, the recording medium disclosed in the Nagamine '626 patent would not have inherently exhibited the specular gloss value recited in the pending claims. For instance, the present specification clearly demonstrates that identical substrates can be coated with the same coating composition and yet produce two recording media exhibiting vastly divergent specular gloss values (see, e.g., the present specification at page 27, line 19 – page 29). Moreover, the differences in surface area between the alumina particles used in the Nagamine '626 patent and the fumed alumina particles recited in the pending claims evidence differences in the alumina particles that one of ordinary skill in the art would expect to produce differences in the gloss of the resulting coatings. Accordingly, the recording media disclosed in the Nagamine '626 patent would not inherently exhibit the specular gloss value recited in the pending claims.

The Chao '395 and Kruse '306 patents do not remedy the deficiencies of the Nagamine '626 patent. The Chao '395 patent discloses an ink-jet recording medium having a coating thereon, the coating comprising a binder and clay (see, e.g., the Chao '395 patent at col. 2, lines 49-67). Indeed, the Chao '395 patent specifically provides that the pigment component of the coating is "essentially 100% clay" (see, e.g., the Chao '395 patent at col. 2, lines 65-66). Thus, the Chao '395 patent cannot properly be considered to teach or suggest a recording medium comprising fumed alumina particles, much less the ink-jet recording medium defined by the pending claims. The Kruse '306 patent generally discloses a recording transparency and a method for making the same. The coating applied to the substrate comprises a multi-component surfactant and a polymeric sorbent comprising one or more transparent cellulose polymers (see, e.g., the Kruse '306 patent at col. 2, lines 27-32). While the Kruse '306 patent does provide that the coating can comprise hydrated alumina and/or silica in order to improve the "pencil tooth" of the transparency, the Kruse '306 patent

only discloses the use of a fumed alumina having a surface area of 100 m²/g. Thus, the Kruse '306 patent cannot properly be considered to teach or suggest a recording medium comprising fumed alumina particles having a surface area of about 30-80 m²/g, as recited in the pending claims.

The Office Action also cites U.S. Patent Application Publication 2002/0164465 A1 in support of its assertion that the Nagamine '626 patent discloses a recording medium comprising fumed alumina particles. While the Applicants do not object to the use of the aforementioned patent application publication in clarifying the type of alumina particles disclosed in the Nagamine '626 patent, the Applicants wish to point out that the aforementioned patent application publication does not constitute prior art to the present application, insofar as that application was filed after the effective filing date of the present application.

As noted above, claims 27, 28, and 49-52 have been canceled without prejudice or disclaimer of the subject matter recited therein. Accordingly, the Section 102 and 103 rejections of those claims have been rendered moot.

In view of the foregoing, the invention defined by the pending claims is neither anticipated by nor obvious over the Nagamine '626 patent, alone or in combination with the Chao '395 patent or the Kruse '306 patent. Indeed, none of the cited references discloses or suggests a recording medium comprising a substrate having a glossy coating thereon, wherein the glossy coating comprises a binder and fumed alumina particles having a surface area of about 30-80 m²/g, as recited in the pending claims. The Section 102 and 103 rejections over the Nagamine '626, Chao '395, and Kruse '306 patents are improper and, therefore, should be withdrawn.

Discussion of the Section 103 Rejection over the Kurabayashi '454 Patent

The Office Action rejects claims 1-3, 5, 7, 27-30, 33, 44-53, and 55-57 as allegedly unpatentable the Kurabayashi '454 patent in view of the combination of the Kobayashi '359 patent, the Okumura '001 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*. In particular, the Office Action asserts that the Kurabayashi '454 patent discloses a recording medium comprising a substrate having a glossy coating thereon, the glossy coating comprising a binder and alumina particles. The Office Action acknowledges that the Kurabayashi '454 patent fails to teach or suggest a recording medium comprising a glossy coating having the specular gloss recited in the pending claims, but asserts that it would have been obvious for one of ordinary skill in the art to modify the recording medium disclosed therein in such a way as to arrive at the

invention defined by the pending claims in view of the Kobayahsi '359 patent. The Office Action further asserts that, in view of the teachings of the Okumura '001 patent, it would have been obvious for one of ordinary skill in the art to modify the recording medium disclosed in the Kurabayashi '454 patent by selecting alumina particles having the surface area recited in the pending claims. Lastly, the Office Action acknowledges that none of the aforementioned references teaches or suggests a recording medium comprising *fumed* alumina particles, but asserts that such modification of the recording medium disclosed in the Kurabayashi '454 patent would have been obvious to one of ordinary skill in the art in view of the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*, alone or in combination. Applicants traverse this rejection.

The Kurabayashi '454 patent generally discloses an ink-jet recording medium comprising a base and a surface layer provided on the base. The surface layer comprises a binder and a pigment, and the Kurabayashi '454 patent further provides that suitable pigments include alumina (see, e.g., the Kurabayashi '454 patent at col. 3, lines 39-42). However, as acknowledged by the Office Action, the Kurabayashi '454 patent does not disclose or suggest a recording medium comprising *fumed* alumina particles having a surface area of 30-80 m²/g, nor does it disclose or suggest a recording medium having a 75° specular gloss of about 15% or more, as recited in the pending claims.

The Kobayashi '359 patent generally discloses an ink-jet recording medium comprising a transparent support and a transparent colorant-receptive layer, which layer is composed of crosslinked polymer particles. While the Kobayashi '359 patent does provide that small amounts of inorganic particles can be added to the colorant-receptive layer as a matting agent, it does not list fumed alumina as a suitable additive. Thus, the Kobayashi '359 patent cannot properly be considered to teach or suggest a recording medium comprising alumina particles, much less fumed alumina particles having a surface area of 30-80 m²/g, as recited in the pending claims.

The Okumura '001 patent discloses an ink-jet recording medium comprising an ink-receiving layer formed on a substrate, wherein the ink-receiving layer contains xerogel pigment particles. The Okumura patent further provides that the xerogel particles can be formed from hydrogel-forming materials, such as aluminum hydroxide, alumina, silica, and magnesium hydroxide. While the Okumura '001 patent does disclose a broad surface area range for the xerogel particles, which overlaps with the range recited in the pending claims, such a broad teaching for xerogel particles would not have motivated one of ordinary skill in the art to modify the recording medium disclosed in the Kurabayashi '454 patent by using alumina particles having a surface area of about 30-80 m²/g. Indeed, xerogel particles are

loosely agglomerated particles formed from metal oxide gels that have been dried and wherein the gel structure has been allowed to collapse. By way of contrast, *fumed* alumina particles are aggregates of smaller primary particles connected in a three-dimensional chain-like structure. Thus, the particles are structurally quite different, and the Okumura '001 patent's teaching regarding suitable surface areas for xerogels cannot, without further motivation, be applied to fumed alumina particles. Moreover, the Okumura '001 patent discloses xerogel particles having a wide range of surface areas (e.g. 25 to 400 m²/g, preferably about 100 to 400 m²/g). However, there is nothing within the Okumura '001 patent that would motivate one of ordinary skill in the art to select a particle having a surface area of about 30-80 m²/g, as recited in the pending claims. Indeed, one of ordinary skill in the art would have been motivated to use a higher surface area particle in view of the fact that all of the Okumura '001 patent's examples utilize relatively high surface area particles and that the range of about 100 to 400 m²/g is indicated as preferred. Thus, the Okumura '001 patent cannot properly be considered to teach or suggest a recording medium comprising fumed alumina particles having a surface area of about 30-80 m²/g.

As noted above, the Office Action acknowledges that the aforementioned references, alone or in combination, fail to teach or suggest a recording medium comprising *fumed* alumina particles. However, the Office Action asserts that such a recording medium would have been obvious to one of ordinary skill in the art in view of the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*, alone or in combination. The Kruse '306 patent merely discloses the use of alumina in the surface layer of the transparency to improve the "pencil tooth," and does not contain any teaching or suggestion regarding the alleged equivalence of fumed alumina and other types of alumina in coatings applied to ink-jet recording media. The Mochizuki '784 patent generally discloses a recording medium comprising a support and an ink-receiving layer, which comprises a binder and solid fine particles, provided thereon. The Mochizuki '784 patent further provides a long list of suitable solid fine particles, which includes alumina, colloidal alumina, hydrated alumina, and aluminum hydroxide (see, e.g., the Mochizuki '784 patent at col. 3, lines 5-19). The Dransmann '855 patent also discloses an ink-jet recording medium comprising a support, a dye-receiving coating, and an upper coating comprising particles of a porous inorganic pigment exhibiting cationic charge centers (see, the Dransmann '855 patent at col. 2, lines 42-46). The Dransmann '855 patent further provides that suitable particles include aluminum oxides, pyrogenic aluminum hydroxides, and aluminum oxide hydrates (see, e.g., the Dransmann '855 patent at col. 2, lines 47-50). However, contrary to the Office Action's assertions, the Mochizuki '784 and the Dransmann '855 patents do not teach or suggest that

fumed alumina is equivalent to other types of alumina in coatings applied to ink-jet recording media. Indeed, the terms "hydrated alumina" and "pyrogenic aluminum hydroxides" refer to a true hydroxide of aluminum (i.e., Al(OH)_3) that is chemically distinct from alumina, which has the chemical formula Al_2O_3 (see, e.g., *The Merck Index*, pp. 61 and 62 (12th Ed.) (copy attached)). Lastly, the excerpted portion of the *Handbook of Fillers* merely provides that the terms "pyrogenic silica" and "fumed silica" refer to the same type of silica. However, the alleged equivalence of the terms "pyrogenic" and "fumed" is irrelevant insofar as the cited references only teach "pyrogenic aluminum hydroxides" (see, e.g., the Dransmann '855 patent at col. 2, lines 476-50), which compounds are chemically distinct from *alumina*, much less *fumed alumina*. Thus, none of the cited references even mentions *fumed alumina*, much less teaches or suggests that it is equivalent to other types of alumina in coatings applied to ink-jet recording media.

As noted above, claims 27, 28, and 49-52 have been canceled without prejudice or disclaimer of the subject matter recited therein. Accordingly, the Section 103 rejection of those claims has been rendered moot.

In view of the foregoing, the invention defined by the pending claims is neither anticipated by nor obvious over the Kurabayashi '454 patent, alone or in combination with the Kobayashi '359 patent, the Okumura '001 patent, and one or more of: the Kruse '306 patent, the Dransmann '855 patent, the Mochizuki '784 patent, and the *Handbook of Fillers*. In particular, none of the cited references teaches or suggests a recording medium comprising a substrate having a glossy coating thereon, wherein the glossy coating comprises a binder and fumed alumina particles having a surface area of about $30\text{-}80 \text{ m}^2/\text{g}$. The Section 103 rejection of the pending claims is improper and, therefore, should be withdrawn.

In re Appln. of Darsillo et al.
Application No. 09/670,118

Conclusion

The application is considered in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would expedite the prosecution of the subject application, the Examiner is invited to call the undersigned attorney.

Respectfully submitted,


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Amendment or ROA - Regular (Revised 5/1/03)